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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR   | ATTORNEY DOCKET NO.        | CONFIRMATION NO. |
|--|-------------|------------------------|----------------------------|------------------|
| 09/782,101   | 02/12/2001  | Govinda Nallappa Rajan | 2                          | 9726             |
| 22046  | 7590        | 06/09/2006             |                            |                  |
| LUCENT TECHNOLOGIES INC.<br>DOCKET ADMINISTRATOR<br>101 CRAWFORDS CORNER ROAD - ROOM 3J-219<br>HOLMDEL, NJ 07733 |             |                        | EXAMINER<br>CURS, NATHAN M |                  |
|  |             |                        | ART UNIT<br>2613           | PAPER NUMBER     |

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                         |  |
|------------------------------|------------------------|-------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b>     |  |
|                              | 09/782,101             | RAJAN, GOVINDA NALLAPPA |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>         |  |
|                              | Nathan Curs            | 2613                    |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 6 and 9-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6 and 9-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima et al. (US Patent No. 4608682) in view of Lim et al. (US Patent No. 6026108).

Regarding claim 6, Nagashima et al. disclose an arrangement for buffering, during a finite predetermined retention time (col. 1, lines 45-53), a digital optical signal having a predetermined digital level (col. 3, lines 39-46), comprising: a semiconductor laser element with an injection current threshold of operation, below which optical loss exceeds optical gain and above which optical gain exceeds optical loss, and optical input for receiving the optical signal (figs. 3a and 3b and col. 3, lines 46-50 and col. 4, lines 14-39); and a current source connected to said semiconductor laser element and arranged to inject an injection current to said semiconductor laser element to establish an optical gain process in said semiconductor laser element (col. 4, lines 25-39 and col. 5, lines 1-18), the injection current having an amplitude at said threshold of operation such that said optical gain and said optical loss process within said semiconductor laser element are equal in order to keep said digital optical signal on said predetermined digital level (col. 4, lines 25-53). Nagashima et al. also disclose a controller connected to said current source to provide a current control signal to said current source to control an amplitude of said injection current (fig. 2, element 20 and col. 5, lines 1-18). In the laser configuration of fig. 2, Nagashima et al. are silent regarding feedback used for continuous

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stabilization of the injection current. Lim et al. discloses continuous stabilization of the injection current of a semiconductor laser at the threshold level for balance between gain and absorption, by using a feedback loop where the laser output is monitored and fed back to the drive circuitry to stabilize the injection current, in order to support the laser operation against environment variations (col. 1, line 60 to col. 2, line 10). It would have been obvious to one of ordinary skill in the art at the time of the invention to use this feedback teaching of Lim et al. for continuously supporting the threshold injection current of Nagashima et al. when the injection current is supposed to be maintained at the threshold (when the laser is being used in memory mode), to enable the laser of Nagashima et al. to resist environmental variations that could alter the injection current produced by the drive circuitry and/or the effective injection current threshold level of the laser. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the controller of Nagashima et al. to translate the laser output feedback signal taught by Lim et al. into control of the voltage source disclosed in Fig. 4 of Nagashima et al., since the voltage source is responsible for producing the injection current for the laser. Further, since the teaching of Lim et al. corresponds to supporting a threshold injection current level, it would have been obvious to one of ordinary skill in the art at the time of the invention, to further the control the voltage source based on the feedback signal only when the injection current is supposed to be maintained at the threshold (when the laser is being used in memory mode), and not when the laser is in reset mode where resetting the laser requires change the injection current level away from the threshold level (this reset action being in contradiction to maintaining an unchanging threshold level).

Regarding claim 9, Nagashima et al. disclose an optical output switch connected between an output of said semiconductor laser element and an output line, and connected to

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said controller to receive an output switch control signal to control outputting said optical signal to said output line (fig. 2, elements 20 and 100, and col. 3, lines 50-56).

3. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima et al. (US Patent No. 4608682) in view of Lim et al. (US Patent No. 6026108), as applied to claims 6 and 9 above, and further in view of Yoshida et al. (US Patent No. 6104477).

Regarding claim 10, the combination of Nagashima et al. and Lim et al. do not disclose an optical output directional filter connected between said output of said semiconductor laser element and said optical output switch. Yoshida et al. disclose a direction filter between a laser and an optical switch (fig. 1, elements 10, 17 and 18 and col. 2, lines 14-22), for suppressing downstream optical noise leaks from reaching the upstream optical source. It would have been obvious to an artisan at the time of the invention to add the directional filter disclosed by Yoshida et al., between the laser and optical output switch of Nagashima et al. to suppress optical noise leaks from reaching the laser.

Regarding claim 11, the combination of Nagashima et al. and Lim et al. disclose an optical input switch connected to said input of said semiconductor laser element (Nagashima et al.: fig. 2, element 60 and col. 3, lines 46-50), and connected to said controller to receive an input switch control signal to control inputting said optical signal to said semiconductor laser element (Nagashima et al.: fig. 2, elements 20 and 60 and col. 4, lines 62-68).

Regarding claim 12, the combination of Nagashima et al. and Lim et al. do not disclose an optical input directional filter connected between said input of said semiconductor laser element and said optical input switch. Yoshida et al. disclose a direction filter adjacent and downstream from an optical switch (fig. 1, elements 20 and 21 and col. 2, lines 29-35), for directing transmission in one direction. It would have been obvious to an artisan at the time of

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the invention to add the directional filter disclosed by Yoshida et al., between the input of the laser and the optical input switch of Nagashima et al. to direct transmission in one direction toward the laser.

Regarding claim 13, the combination of Nagashima et al. and Lim et al. disclose that said controller is arranged for controlling said current source such that said current source clears said semiconductor laser element by turning off said injection current during a predetermined clearing time period prior to switching said digital optical signal to said semiconductor laser element by said optical input switch (Nagashima et al.: col. 4, lines 62-68).

### ***Response to Arguments***

4. Applicant's arguments filed 27 March 2006 have been fully considered but they are not persuasive.

The applicant argues that a skilled person would not be motivated to modify Nagashima based on Lim because Nagashima's device would already appear to operate adequately. However, the motivation to modify Nagashima need not require that Nagashima would appear to operate inadequately. The motivation to combine in the rejection is properly based on the advantage that would be produced by the combination, i.e. enabling the laser of Nagashima to resist environmental variations that could alter the injection current produced by the drive circuitry and/or the effective injection current threshold level of the laser.

The applicant also argues against the combination by stating that Nagashima's laser is inherently robust and that any slight changes in the environmental conditions will not lead to the Nagashima laser changing state such that an incorrect reading results. However, this is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness. Nagashima does not address resistance to environmental variations, thus

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the motivation to modify Nagashima based on Lim, to enable Nagashima to resist environmental variations, is proper.

The applicant also argues against the combination by stating that Nagashima is aware of feedback and uses it in the optical coupler embodiment, but does not suggest using feedback with the bistable laser embodiment. However, the optical coupler embodiment is merely one alternative to the bistable laser embodiment, and is not a teaching away from using feedback with the bistable laser embodiment in order to achieve resistance to environmental variations. The disclosure of an alternative does not constitute a teaching away, because such disclosure does not criticize, discredit, or otherwise discourage the combination.

The applicant states that the applicant's operating regime is different from Nagashima because the applicant's operating regime is inherently unstable. However, this is misleading, because the applicant's laser would only be unstable if there was no control or unstable control of the injection current. However, the applicant is claiming feedback control of the injection current. The claimed use of feedback is for the very purpose of stabilizing the optical gain vs. optical absorption of the laser. The applicant's quote of page 3, line 3 emphasizes this in stating, "in order to be sure that [the gain and absorption] outweigh one another". This is a statement of stable operation, not unstable operation. The sole purpose of the applicant's "continuous adjustment" of the current control signal is to "keep said digital optical on said predetermined digital level" as claimed, in other words, to continuously correct any deviations of the level. This type of "continuous adjustment" is the **opposite** of the kind of adjustment that would consist of varying the current control signal to continuously cause intentional deviations of the digital optical signal level from a predetermined level.

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5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### ***Conclusion***

6. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR



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system, see <http://pairedirect.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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